

WHAT IS CLAIMED IS:

1. A method of producing an electron-emitting device comprising the step of forming a pair of electrodes and an electrically-conductive thin film on
5 a substrate in such a manner that said pair of electrodes are in contact with said electrically-conductive thin film and forming an electron emission region using said electrically-conductive thin film, wherein a solution
10 containing a metal element is supplied in a droplet form onto said substrate thereby forming said electrically-conductive thin film.

2. A method of producing an electron-emitting
15 device according to Claim 1, wherein said electrically-conductive thin film is formed after forming said pair of electrodes.

3. A method of producing an electron-emitting
20 device according to Claim 1, wherein said electrically-conductive thin film is formed before forming said pair of electrodes.

4. A method of producing an electron-emitting
25 device according to Claim 1, wherein said droplet is supplied by means of an ink-jet technique.

5. A method of producing an electron-emitting device according to Claim 4, wherein said ink-jet technique is to form a bubble in a solution by means of thermal energy thereby ejecting said solution in a droplet form.

6. A method of producing an electron-emitting device according to Claim 2, wherein the amount of said droplet supplied between said pair of electrodes is less than the volume of a recessed space formed with said substrate and said pair of electrodes.

7. A method of producing an electron-emitting device according to Claim 1, including the steps of: supplying one or more droplets of solution onto said substrate, said solution including a material constituting said electrically-conductive thin film; detecting the state of said supplied droplets; and supplying one or more droplets again on the basis of the obtained information of the state of said supplied droplets.

8. A method of producing an electron-emitting device according to Claim 7, wherein said solution containing the material constituting said thin film is a solution in which said material is dispersed.

9. A method of producing an electron-emitting device according to Claim 7, wherein said solution containing the material constituting said thin film is a solution in which said material is dissolved.

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10. A method of producing an electron-emitting device according to Claim 7, wherein the items of the state of the supplied droplet to be detected include at least one item selected from the items including the presence or absence of a droplet, the amount of a supplied droplet, and the location at which a droplet is supplied.

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11. A method of producing an electron-emitting device according to Claim 7, wherein in the case where no droplet has been deposited, a droplet is supplied again under the same condition.

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12. A method of producing an electron-emitting device according to Claim 7, wherein in the case where the amount of the supplied droplet is greater than an acceptable upper limit, at least a part of said supplied droplet is removed.

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13. A method of producing an electron-emitting device according to Claim 7, wherein in the case where a droplet has been supplied in an inadequate fashion, a

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droplet is supplied again after adjusting the ejecting condition.

14. A method of producing an electron-emitting
5 device according to Claim 7, wherein, on the basis of
information obtained by detecting the state of a
supplied droplet, the ejecting condition for another
ejecting position is adjusted.

10 15. A method of producing an electron-emitting
device according to Claim 13, wherein said ejecting
conditions to be adjusted include at least either the
number of times of ejecting operations or the ejecting
position.

15 16. A method of producing an electron-emitting
device according to Claim 7, wherein the state of a
supplied droplet is detected by illuminating the
position at which said droplet is supplied and then
20 detecting the light which is either reflected from said
position or transmitted through said position.

17. A method of producing an electron-emitting
device according to Claim 7, wherein the state of a
25 supplied droplet is detected after positioning the
detection position at a predetermined position at which
a droplet is to be supplied.

18. A method of producing an electron-emitting device according to Claim 1, wherein said electrically-conductive thin film is formed by supplying a plurality of droplets so that the center-to-center distance between adjacent dots formed by said droplets is less than the diameter of said dot.

19. A method of producing an electron-emitting device according to Claim 18, wherein the film thickness of the electron emission region formed of said electrically-conductive thin film is controlled by controlling the amount of a supplied droplet and/or the number of supplied droplets.

20. A method of producing an electron-emitting device according to Claim 18, wherein before supplying said droplet onto said substrate, the surface of said substrate is treated so that the surface of said substrate becomes hydrophobic.

21. An electron source substrate comprising a plurality of electron-emitting devices disposed on said substrate, wherein said electron-emitting devices are produced by the method according to Claim 1.

22. An electron source wherein a plurality of electron-emitting devices formed on the electron source

substrate according to Claim 21 are connected to each other.

23. A display panel comprising a rear plate
5 provided with said electron source according to Claim
22 and a face plate provided with a fluorescent film,
wherein said rear plate and said face plate are located
at opposing positions, whereby said fluorescent film is
irradiated by an electron emitted by said electron
10 source thereby displaying an image.

24. An image-forming apparatus comprising the
display panel according to Claim 23, wherein a driving
circuit is connected to said display panel.

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25. An apparatus for producing an
electron-emitting device, said apparatus comprising:
droplet supplying means for ejecting a droplet
containing a metal element toward a substrate thereby
20 supplying said droplet on said substrate; detection
means for detecting the state of said supplied droplet;
and control means for controlling the ejecting
condition of said droplet supplying means on the basis
of the information obtained via said detection means.

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26. An apparatus according to Claim 25,
wherein said detection means includes at least either

droplet information detection means for detecting the presence or absence of a droplet and also detecting the amount of the droplet or droplet arrival position detection means for detecting the position at which a
5 droplet has been supplied.

27. An apparatus according to Claim 26,
wherein said droplet information detection means and said droplet arrival position detection means are both
10 implemented within the same single optical detecting system.

28. An apparatus according to Claim 26,
capable of simultaneously detecting both droplet
15 information and droplet arrival position.

29. An apparatus according to Claim 26,
capable of successively detecting the droplet
information and the droplet arrival position.
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30. An apparatus according to Claim 25,
further comprising positioning means for performing a positioning operation on the basis of the information
obtained via said detection means.
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31. An apparatus according to Claim 25,
further comprising droplet removing means for removing

at least a part of the supplied droplet.

32. An apparatus according to Claim 31,
wherein said droplet removing means includes a
5 dedicated removing nozzle for ejecting gas thereby
blowing away a droplet from a gap.

33. An apparatus according to Claim 25,
wherein said droplet supplying means is based on an
10 ink-jet technique.

34. An apparatus according to Claim 33,
wherein said ink-jet technique is to form a bubble in a
solution by means of thermal energy thereby ejecting
15 said solution in a droplet form.

35. An apparatus according to Claim 33,
wherein said ink-jet technique is to eject a solution
in a droplet form by means of using a piezo-electric
20 device.